

WHAT IS CLAIMED IS:

1. A method of optimizing performance of a well system, the method comprising the steps of:

5 accumulating multiple data sets, each data set including at least one parameter influencing an output of the well system, and at least one parameter indicative of the well system output; and

 training a neural network to model the output of the well system in response to the influencing parameters.

10 2. The method according to Claim 1, wherein the training step further comprises training the neural network utilizing the data sets, the trained neural network outputting the indicative parameters in response to input of the respective influencing parameters to the neural network.

15 3. The method according to Claim 1, wherein in the accumulating step, the influencing parameters include valve positions.

 4. The method according to Claim 1, wherein in the accumulating step, the indicative parameters include production rates.

 5. The method according to Claim 1, further comprising the step of inputting an output of the trained neural network to a geologic model.

20 6. The method according to Claim 5, further comprising the step of inputting an output of the geologic model to a financial model.

- 11 -

7. The method according to Claim 6, further comprising the step of optimizing an output of the financial model in response to input of prospective influencing parameters to the neural network.

8. The method according to Claim 7, wherein the optimizing step
5 further comprises determining a respective value for each of the prospective influencing parameters, whereby the output of the financial model in response to input of the prospective influencing parameters to the neural network is optimized.

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9. A method of optimizing performance of a well system, the method comprising the steps of:

training a neural network to model an output of the well system in response to at least one variable parameter of the well system;

5 inputting an output of the neural network to at least one valuing model; and

optimizing an output of the valuing model in response to input of the well system parameter to the neural network.

10. The method according to Claim 9, wherein the training step further
10 comprises inputting multiple data sets to the neural network, each of the data sets including at least one known parameter influencing the well system output.

11. The method according to Claim 10, wherein in the training step, the known influencing parameter is a position of a valve in the well system.

12. The method according to Claim 10, wherein the training step
15 further comprises training the neural network to output at least one known parameter indicative of the well system output in response to the input to the neural network of the known influencing parameter.

13. The method according to Claim 12, wherein in the training step, the known indicative parameter is a production rate in the well system.

20 14. The method according to Claim 9, wherein in the inputting step, the at least one valuing model includes a geologic model and a financial model.

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- 13 -

15. The method according to Claim 14, wherein in the inputting step, the output of the neural network is input to the geologic model, and an output of the geologic model is input to the financial model.

16. The method according to Claim 9, wherein in the optimizing step, 5 the well system parameter is varied to maximize the valuing model output.

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